Trend Study 21-16-98

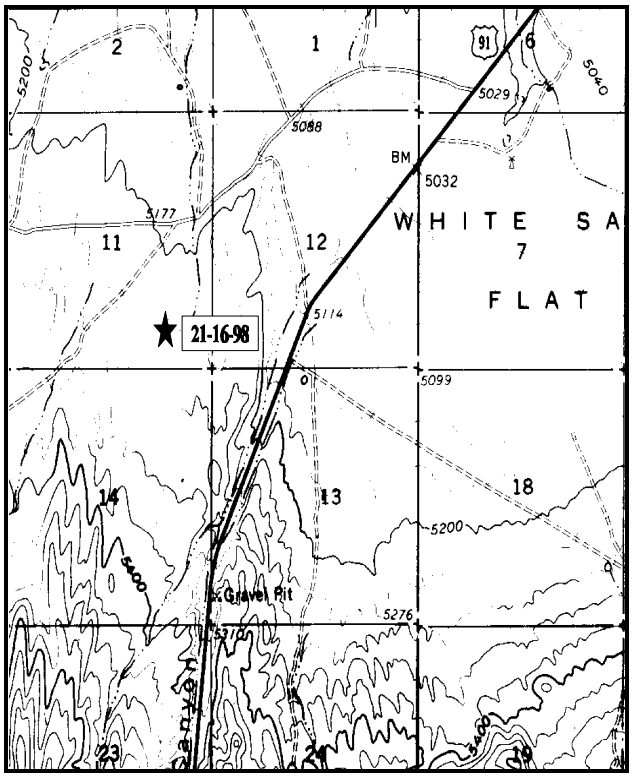
Study site name: Baker Canyon . Range type: Big Sagebrush-Grass .

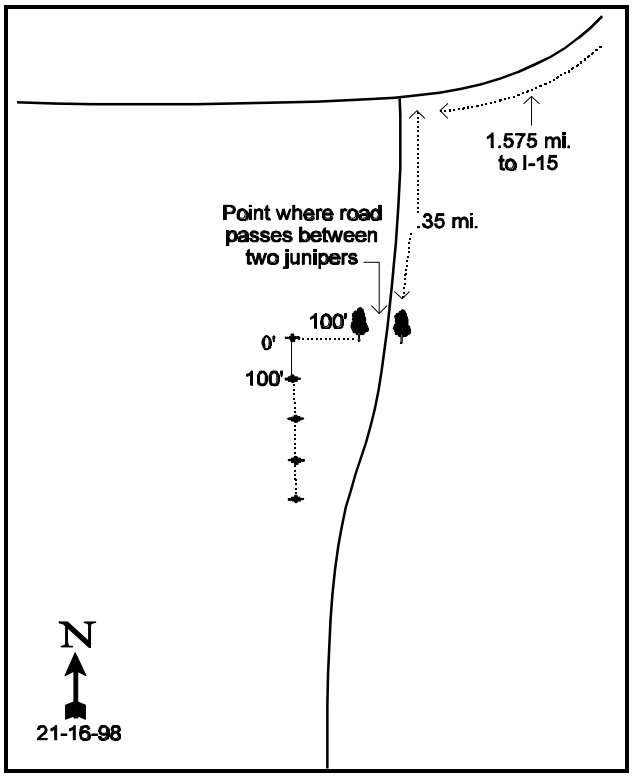
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Proceed south from Kanosh on the main road. Turn left just before the I-15 interchange. Travel on the frontage road for 1.8 miles (paralleling the freeway on the east side) to an overpass. Go over the interstate and continue 0.5 miles west to a fork. Take the left fork and go about 1.05 miles. Just beyond the point of a small hill turn left on a 2-tire track road. Go 0.35 miles to the first point where the road squeezes between two junipers. From the south side of the large juniper to the right, go 100 feet due west to the start of the frequency baseline. The 0-foot baseline stake is a rebar, tagged #7071.





Map Name: Cove Fort, Utah Diagrammatic Sketch

Township 24S , Range 7W , Section 11 UTM 4288115.455 N, 360986.614 E

DISCUSSION

Trend Study No. 21-16 (41-11/55-6)

The Baker Canyon trend study samples deer winter range west of I-15 and the White Sage Flat area. It is an arid, nearly level site with a slight west aspect at an elevation of 5,300 feet. The range type is Wyoming big sagebrush-grass with scattered junipers. Some of the surrounding area was plowed and drilled with Russian wildrye in 1967, but the study site itself was not treated. It has been used for spring grazing on a three pasture rest-rotation system. The BLM did a control burn of the area prior to the 1991 reading to reduce Wyoming big sagebrush. The original frequency baseline remained unburned but the density plots were burned which effectively reduced the sagebrush density by 95%. Traditionally, deer concentrate in the White Sage Flat area in the winter and spring, but past use was reported as being light. Sheep appeared to have used the area in the past putting heavy pressure on the sagebrush. Pellet group data from 1998 estimate 19 deer and 7 cow use days/acre. Deer use is concentrated in the remaining fingers of unburned sagebrush.

The soil is a moderately shallow sandy clay loam of the Pharo Series which is very cobbly on the surface and through the soil profile. Effective rooting depth (see methods) is estimated at just over 11 inches. It is moderately eroded and a concentration of pavement and rock is left on the surface averaging 28% cover in 1998. Parent material is limestone. There is a buildup of litter and soil around the plants, but generally litter cover is low and bare soil abundant. Soil movement is not a serious problem because of the levelness of the terrain.

The most abundant and palatable browse species is Wyoming big sagebrush which had a density of nearly 4,000 plants/acre in 1985. The rather short sagebrush plants had a "clubbed" appearance, which may be the result of past heavy hedging (by sheep and/or deer) and poor annual growth (drought). Before the burn (1985), the majority of the population was made up of old mature plants, many classified as decadent (42%). However, seedlings and young were well represented. Since the burn, the density of sagebrush was estimated at only 199 plants/acre in 1991, with no seedlings and young plants accounting for 67% of the population. The new, much larger sample size used in 1998 estimated 780 sagebrush plants/acre, 79% of which are mature. Shrub density is now estimated along five, 100 foot belts located on a 400 foot baseline which includes the original unburned frequency baseline. Nearly all of the sagebrush on the site occurs within this unburned section while burned areas are dominated by herbaceous vegetation. Utilization of the sagebrush is similar to previous years with mostly moderate use and normal vigor on all plants.

Some juniper trees were killed by the burn, but many remain scattered through the area. Other browse species are present in low numbers and include: ephedra, rubber rabbitbrush, and narrowleaf low rabbitbrush.

The herbaceous vegetation is a significant component of this site especially since the burn. Common grasses include: bluebunch wheatgrass, Sandberg bluegrass, and bottlebrush squirrel. Cheatgrass is present but not dominant, producing 39% of the grass cover. Forbs provide little forage but some species are fairly common.

1985 APPARENT TREND ASSESSMENT

Soil trend is stable, owing mainly to the levelness of the site. Vegetative trend also appears stable, except junipers appear to be very slowly encroaching onto the sagebrush flat. The sagebrush appears to have been very heavily used but the age class composition indicates a self-sustaining population. This is an area where deer look for an early green-up feed source each spring. Any management to increase the herbaceous component without eliminating the sagebrush would be beneficial to both deer and livestock.

1991 TREND ASSESSMENT

The soil trend continues to be stable with a slight increase in vegetative basal cover and small decrease in percent bare ground. The most significant change is the burn treatment that took place since 1985. It affected

the density plots, but not the frequency baseline. The burn effectively left a mosaic pattern of shrub and grass openings. The key browse species, Wyoming big sagebrush, decreased by 95% while all of the juniper around the density plots were kill by the fire. For key browse, the overall trend is down. The herbaceous understory has shown significant improvement for the grasses, but much of the increased sum of nested frequency for forbs is for increasers like Russian thistle. Bluebunch wheatgrass, Indian ricegrass, Sandberg bluegrass, and bottlebrush squirreltail have all demonstrated substantial increases in their frequencies. The change is more significant than the data shows due to the fact that nearly all of the frequency data comes from the unburned part of the frequency baseline. Overall trend for herbaceous understory is up.

TREND ASSESSMENT
soil - stable
browse - down with the burning treatment
herbaceous understory - up

1998 TREND ASSESSMENT

Trend for soil appears down due to an increase in percent bare ground from 24% to 41% and a decline in litter cover (43% to 29%). Some of the differences are due to the larger sample used in 1998 which sampled more of the burned areas. Previous frequency and cover data came almost entirely from an unburned finger of Wyoming big sagebrush which actually has higher vegetative and litter cover. The burned areas contain mostly bunch grasses with bare ground in between. Photo point comparisons do not show any significant changes in ground cover characteristics. With this in mind, trend for soil is considered stable. No erosion is noticeable due in part to the level terrain. Trend for browse appears stable. Again, the last reading sampled sagebrush only in burned areas while the new, much larger sample includes part of the original frequency baseline which was left mostly unburned. Most of the mature and decadent shrubs sampled occurred within this unburned section. Utilization of the sagebrush is similar to 1991 levels, vigor is normal on all plants and percent decadence is low at 15%. Recruitment is poor however with no seedlings and few young being sampled. Trend for the herbaceous understory is stable for grasses but down for forbs. Nested frequency of the dominant grass, bluebunch wheatgrass, has increased significantly since 1991. However, more of the burned areas were sampled in 1998 where bluebunch wheatgrass is more abundant. All other perennial grasses encountered in 1991 declined significantly in nested frequency. Sum of nested frequency of perennial forbs has declined since 1991, but much of the difference is due to a lower frequency of Russian thistle. Trend is considered stable for the herbaceous understory.

TREND ASSESSMENT
soil - stable
browse - stable
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 21 , Study no: 16

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron spicatum	$_{a}$77	$_{a}$69	$_{b}$132	32	34	51	7.48
G	Bromus tectorum (a)	-	-	238	-	-	84	6.51
G	Elymus junceus	-	-	1	-	-	1	.00
G	Oryzopsis hymenoides	$_{a}$4	$_{b}$23	$_{a}$8	2	10	3	.39
G	Poa fendleriana	$_{b}$8	$_{a}$-	$_{ab}$1	4	-	1	.15
G	Poa secunda	$_{a}$53	$_{b}$96	$_{a}$62	24	39	29	1.73
G	Sitanion hystrix	$_{a}$28	$_{b}$68	$_{a}$24	14	29	13	.52
Total Annual Grasses		0	0	238	0	0	84	6.51
Total Perennial Grasses		170	256	228	76	112	98	10.28
F	Alyssum alyssoides (a)	-	-	304	-	-	92	3.30
F	Antennaria rosea	-	3	-	-	1	-	-
F	Astragalus calycosus	$_{a}$-	$_{b}$48	$_{b}$62	-	19	28	.93
F	Astragalus marianus	17	26	3	8	11	3	.04
F	Calochortus nuttallii	-	3	-	-	2	-	-
F	Chaenactis douglasii	3	12	-	1	5	-	-
F	Comandra pallida	-	-	5	-	-	2	.03
F	Crepis acuminata	-	2	-	-	1	-	-
F	Draba spp. (a)	-	-	4	-	-	2	.01
F	Erodium cicutarium (a)	-	-	59	-	-	21	1.17
F	Lactuca serriola	-	4	1	-	3	1	.00
F	Machaeranthera canescens	$_{b}$33	$_{a}$8	$_{ab}$15	15	6	11	.23
F	Phlox hoodii	$_{a}$25	$_{b}$56	$_{b}$64	13	24	25	2.58
F	Phlox longifolia	-	18	-	-	9	-	-
F	Ranunculus testiculatus (a)	-	-	138	-	-	46	1.04
F	Salsola iberica (a)	-	58	-	-	30	-	-
F	Sphaeralcea coccinea	14	25	33	7	12	12	1.40
F	Thlaspi alpestre	$_{b}$11	$_{a}$-	$_{a}$-	5	-	-	-
Total Annual Forbs		0	58	505	0	30	161	5.52
Total Perennial Forbs		103	205	183	49	93	82	5.25

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 21 , Study no: 16

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	23	3.15
B	Chrysothamnus nauseosus albicaulis	1	1.00
B	Chrysothamnus viscidiflorus stenophyllus	10	.99
B	Ephedra nevadensis	4	1.23
B	Gutierrezia sarothrae	0	-
B	Juniperus osteosperma	2	2.90
Total for Browse		40	9.29

CANOPY COVER --
Herd unit 21 , Study no: 16

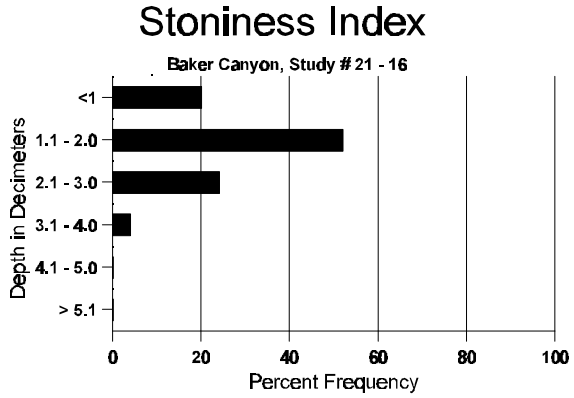
Species	Percent Cover '98
Juniperus osteosperma	2

BASIC COVER --
Herd unit 21 , Study no: 16

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	364	2.50	4.50	33.32
Rock	205	2.00	2.75	4.11
Pavement	326	26.00	22.75	23.60
Litter	390	40.25	42.75	28.61
Cryptogams	43	4.50	3.75	1.54
Bare Ground	320	24.75	23.50	40.77

SOIL ANALYSIS DATA --
Herd Unit 21, Study # 16, Study Name: Baker Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.1	50.6 (11.8)	7.1	48.0	27.4	24.6	1.0	16.8	140.8	.6



PELLET GROUP FREQUENCY --
Herd unit 21 , Study no: 16

Type	Quadrat Frequency '98
Rabbit	7
Deer	13
Cattle	4

BROWSE CHARACTERISTICS --
Herd unit 21 , Study no: 16

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	4	5	-	-	-	-	-	-	-	9	-	-	-	600			9
	91	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	2	-	-	-	-	-	-	-	-	1	1	-	-	40			2
M	85	12	13	1	-	-	-	-	-	-	26	-	-	-	1733	26	22	26
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66	8	8	1
	98	15	15	-	1	-	-	-	-	-	30	-	-	-	620	21	27	31
D	85	1	21	3	-	-	-	-	-	-	17	-	-	8	1666			25
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	5	1	-	-	-	-	-	-	6	-	-	-	120			6
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	65%	07%	13%	-95%
'91	67%	00%	00%	+74%
'98	51%	03%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	3999	Dec:	42%
	'91	199		0%
	'98	780		15%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus albicaulis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	43	80	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	20			-

Chrysothamnus viscidiflorus stenophyllus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66	10	4	1
	98	13	-	-	-	-	-	-	-	-	13	-	-	-	260	10	13	13
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	100%	00%	00%	+75%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	66			-
'98	260			-

Ephedra nevadensis																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66	19	21	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	30	43	1
	98	1	1	1	-	-	-	-	-	-	3	-	-	-	60	26	49	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	100%	00%	00%	+ 0%
'91	00%	00%	00%	+34%
'98	20%	20%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	66	Dec:		-
'91	66			-
'98	100			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	19	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)			
	'85	0	Dec: -
	'91	0	-
	'98	0	-

Juniperus osteosperma																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	1	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)			
	'85	266	Dec: -
	'91	0	-
	'98	40	-